

### REMARKS

Claims 1 through 55 are pending in this application. Claims 1, 18, and 37 are amended herein. Support for the amendments to the claims may be found in the claims as originally filed. Reconsideration is requested based on the foregoing amendment and the following remarks.

#### Claim Rejections - 35 U.S.C. § 112:

Claims 1 through 6, 11, and 13 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. Claim 1 has been amended to make it more definite. In particular, claim 1 has been amended to make it clear that the language "that inner diameter" refers to option (ii) only. Withdrawal of the rejection is earnestly solicited.

#### Claim Rejections - 35 U.S.C. § 102:

Claims 1 through 3, 6, 11, 13, 18, 20 through 22, 25, 30, 37, 39 through 41, 44, 49 and 51 were rejected under 35 U.S.C. § 102(b) as anticipated by Charlton et al., US 4,106,907 in light of Lee et al., US 3,948,823. The rejection is traversed.

Amended claim 1 recites, in pertinent part:

"an inner diameter of said upper region is larger than an inner diameter of said middle region, wherein (i) an inner diameter of said middle region is larger than an inner diameter of said lower region or (ii) the inner diameter of said middle region is the same as the inner diameter of said lower region."

Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a middle region, and either (i) an inner diameter of the middle region is larger than an inner

diameter of a lower region or (ii) the inner diameter of the middle region is the same as the inner diameter of the lower region, as recited in amended claim 1. In Charlton, rather, two regions ( zone 2 and zone 3 respectively in Fig. 1) are shown connected by a taper. A tapered region has no diameter, per se. Lee shows no centrifuge tube at all.

Amended claim 1 recites further,

“wherein that inner diameter of the lower region and middle region having the same inner diameter is small enough to trap an air bubble between two layers of aqueous liquid.”

Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of a lower region and a middle region have an inner diameter small enough to trap an air bubble between two layers of aqueous liquid, as recited in amended claim 1.

Charlton describes no trapped bubble at all, let alone an air bubble held between aqueous liquids. Lee involves air bubbles in an organic polymer, rather than air bubbles in aqueous liquids, as recited in amended claim 1. The mixture of Lee is polymerizing and therefore much more viscous than water or other aqueous solutions.

Furthermore, Lee makes no mention of sizes of the air bubbles. The air bubbles may be very tiny, and therefore not capable of separating two aqueous liquids as recited in amended claim 1. There is a difference between the sizes of an air bubble that is held in place by the inner sides of the lower region of an ultracentrifuge tube and air which is trapped in a polymer when a polymerizing liquid is agitated vigorously. In

Lee, there is no suggestion or hint that the air bubbles are even contacting the inner sides of the centrifuge tube.

Furthermore, a tapered lower portion will not hold an air bubble very well. The purpose of the air bubble in the present invention is to divide and maintain two aqueous liquids separate. Charlton, in contrast, describes specifically a desire to mix the contents at column 3, lines 38-40, and warns against making the internal diameter so small as to make mixing difficult. Charlton thus teaches away from the claimed invention.

Furthermore, the claims recite an "ultracentrifuge" tube. The tubes used in Charlton are centrifuge tubes. This is a significant difference because conventional centrifuge tube cannot be used for ultracentrifugation because they crush under the higher g forces.

Charlton describes centrifuging the tubes at 1000g at column 2, line 46 and column 6, line 35. Ultracentrifugation, in contrast, is generally in the hundreds of thousands of g. The materials and design used to make ultracentrifuge tubes is generally different from those used for centrifuge tubes.

Furthermore, the fact that Lee alludes to removing bubbles in no way makes a bubble trapped between two layers of aqueous liquid inherent, contrary to the assertion in the office action. The bubbles Lee seeks to remove may just as well have been in solution, or held to the wall of centrifuge tube by surface tension between the bubble and the wall in the same way small bubbles adhere to the inside of a glass full of soda, and thus be too small to separate aqueous liquids.

Furthermore, the bubbles in Lee could have been expected to float up out of the solution eventually, rather than being trapped, and Lee only proposes use of a centrifuge to remove them to speed the removal process. Amended claim 1 is thus submitted to be allowable. Withdrawal of the rejection of amended claim 1 is earnestly solicited.

Claims 2 through 3, 6, 11, and 13 depend from amended claim 1 and add further distinguishing elements. Claims 2 through 3, 6, 11, and 13 are thus also submitted to be allowable. Withdrawal of the rejection of claims 2 through 3, 6, 11, and 13 is also earnestly solicited.

Amended claim 18 recites, in pertinent part:

"an inner diameter of said upper region is larger than an inner diameter of said lower region, wherein said upper region is separated from said lower region by said middle region having at least one portion with parallel inner sides and an overall decreasing diameter from said upper region toward said lower region."

Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one portion with parallel inner sides and an overall decreasing diameter from the upper region toward the lower region, as recited in amended claim 18.

In Charlton, rather, two regions ( zone 2 and zone 3 respectively in Fig. 1) are shown connected by a taper. A tapered region has no parallel inner sides. Lee shows

no centrifuge tube at all. Amended claim 18 is thus submitted to be allowable.

Withdrawal of the rejection of amended claim 18 is earnestly solicited.

Claims 20 through 22, 25, and 30 depend from amended claim 18 and add further distinguishing elements. Claims 20 through 22, 25, and 30 are thus also submitted to be allowable. Withdrawal of the rejection of claims 20 through 22, 25, and 30 is also earnestly solicited.

Amended claim 37 recites, in pertinent part:

"an inner diameter of said upper region is larger than an inner diameter of said lower region, wherein said upper region is separated from said lower region by said middle region having at least one cylindrical shaped portion."

Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one cylindrical shaped portion, as recited in amended claim 37.

In Charlton, rather, two regions ( zone 2 and zone 3 respectively in Fig. 1) are shown connected by a taper. A tapered region has no cylindrical shaped portion. Lee shows no centrifuge tube at all. Amended claim 37 is thus submitted to be allowable. Withdrawal of the rejection of amended claim 37 is earnestly solicited.

Claims 39 through 41, 44, 49 and 51 depend from amended claim 37 and add further distinguishing elements. Claims 39 through 41, 44, 49 and 51 are thus also submitted to be allowable. Withdrawal of the rejection of claims 39 through 41, 44, 49 and 51 is also earnestly solicited.

Rejections under 35 U.S.C. § 103:

Claims 4, 23, and 42 have been rejected under 35 U.S.C. § 103 as being unpatentable over Charlton in view of Lee, and further in view of Simmons et al. US 4,260,873. The rejection is traversed. Reconsideration is earnestly solicited.

Claim 4 depends from amended claim 1 and adds further distinguishing features.

Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a middle region, and either (i) an inner diameter of the middle region is larger than an inner diameter of a lower region or (ii) the inner diameter of the middle region is the same as the inner diameter of the lower region, as discussed above with respect to amended claim 1. Simmons shows no ultracentrifuge tube at all, and thus cannot make up for the deficiencies of Charlton and Lee with respect to amended claim 1.

Since neither Charlton, Lee, nor Simmons teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a middle region, and either (i) an inner diameter of the middle region is larger than an inner diameter of a lower region or (ii) the inner diameter of the middle region is the same as the inner diameter of the lower region, their combination cannot, either. Claim 4 is thus submitted to be allowable. Withdrawal of the rejection of claim 4 is earnestly solicited.

Claim 23 depends from amended claim 18 and adds further distinguishing features. Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower

region, and the upper region is separated from the lower region by a middle region having at least one portion with parallel inner sides and an overall decreasing diameter from the upper region toward the lower region, as discussed above with respect to amended claim 18. Simmonds shows no ultracentrifuge tube at all, and thus cannot make up for the deficiencies of Charlton and Lee with respect to amended claim 18.

Since neither Charlton, Lee, nor Simmonds teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one portion with parallel inner sides and an overall decreasing diameter from the upper region toward the lower region, their combination cannot, either. Claim 23 is thus submitted to be allowable. Withdrawal of the rejection of claim 23 is earnestly solicited.

Claim 42 depends from amended claim 37 and adds further distinguishing features. Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one cylindrical shaped portion, as discussed above with respect to amended claim 37. Simmonds shows no ultracentrifuge tube at all, and thus cannot make up for the deficiencies of Charlton and Lee with respect to amended claim 37.

Since neither Charlton, Lee, nor Simmonds teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower

region by a middle region having at least one cylindrical shaped portion, their combination cannot, either. Claim 42 is thus submitted to be allowable. Withdrawal of the rejection of claim 42 is earnestly solicited.

Claims 5, 24, and 43 have been rejected under 35 U.S.C. § 103 as being unpatentable over Charlton in view of Lee, and further in view of Saunders et al. US 5,550,060. The rejection is traversed. Reconsideration is earnestly solicited.

Claim 5 depends from amended claim 1 and adds further distinguishing features.

Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a middle region, and either (i) an inner diameter of the middle region is larger than an inner diameter of a lower region or (ii) the inner diameter of the middle region is the same as the inner diameter of the lower region, as discussed above with respect to amended claim 1. Saunders shows no ultracentrifuge tube at all, and thus cannot make up for the deficiencies of Charlton and Lee with respect to amended claim 1.

Since neither Charlton, Lee, nor Saunders teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a middle region, and either (i) an inner diameter of the middle region is larger than an inner diameter of a lower region or (ii) the inner diameter of the middle region is the same as the inner diameter of the lower region, their combination cannot, either. Claim 5 is thus submitted to be allowable. Withdrawal of the rejection of claim 5 is earnestly solicited.



Claim 24 depends from amended claim 18 and adds further distinguishing features. Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one portion with parallel inner sides and an overall decreasing diameter from the upper region toward the lower region, as discussed above with respect to amended claim 18. Saunders shows no ultracentrifuge tube at all, and thus cannot make up for the deficiencies of Charlton and Lee with respect to amended claim 18.

Since neither Charlton, Lee, nor Saunders teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one portion with parallel inner sides and an overall decreasing diameter from the upper region toward the lower region, their combination cannot, either. Claim 24 is thus submitted to be allowable. Withdrawal of the rejection of claim 24 is earnestly solicited.

Claim 43 depends from amended claim 37 and adds further distinguishing features. Neither Charlton nor Lee teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one cylindrical shaped portion, as discussed above with respect to amended claim 37. Saunders shows no ultracentrifuge tube at all, and thus cannot make up for the deficiencies of Charlton and Lee with respect to amended claim 37.

Since neither Charlton, Lee, nor Saunders teach, disclose, or suggest an ultracentrifuge tube in which an inner diameter of an upper region is larger than an inner diameter of a lower region, and the upper region is separated from the lower region by a middle region having at least one cylindrical shaped portion, their combination cannot, either. Claim 43 is thus submitted to be allowable. Withdrawal of the rejection of claim 43 is earnestly solicited.

Double Patenting:

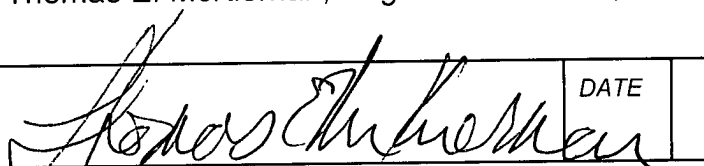
Claims 1 through 6, 11, 13, 18 through 25, 30, 32, 37 through 44, 49 and 51 were rejected under the judicially created doctrine of obviousness double patenting as being unpatentable over claims 1 through 25 of Anderson et al., US 6,254,834. The rejection is traversed.

M.P.E.P. § 804(II)(B)(1) requires that an obviousness-type double patenting rejection make clear the reasons why a person of ordinary skill in the art would conclude that the invention defined in the claim at issue is an obvious variation of the invention defined in the patent. The Applicant requests respectfully that the Office Action do so. In the alternative, claims 1 through 6, 11, 13, 18 through 25, 30, 32, 37 through 44, 49 and 51 are submitted to be allowable. Withdrawal of the rejection of claims 1 through 6, 11, 13, 18 through 25, 30, 32, 37 through 44, 49 and 51 is earnestly solicited.

Conclusion:

Accordingly, in view of the reasons given above, it is submitted that all claims 1 through 55 are allowable over the cited references. Since the claims have been

amended to overcome the rejections based on 35 U.S.C. § 112, second paragraph, it is submitted that all of claims 1 through 55 are now allowable. Allowance of all claims 1 through 55 and of this entire application are therefore respectfully requested.

<b>RESPECTFULLY SUBMITTED,</b>			
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Version with markings to show changes made.

1. (Amended) An ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said middle region, wherein (i) an inner diameter of said middle region is larger than an inner diameter of said lower region or (ii) the inner diameter of said middle region is the same as the inner diameter of said lower region, wherein that inner diameter of the lower region and middle region having the same inner diameter is small enough to trap an air bubble between two layers of aqueous liquid such that the air bubble will keep said two layers of aqueous liquid separate so long as said ultracentrifuge tube is at rest, and wherein said lower region has a closed bottom.
18. (Amended) An ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said lower region, wherein said upper region is separated from said lower region by said middle region having at least one portion with parallel inner sides and an overall decreasing diameter from said upper region toward said lower region and wherein said lower region has a closed bottom.
37. (Amended) An ultracentrifuge tube comprising an upper centri[petal]fugal region having a cylindrical shape, a middle region having a cylindrical shape and a lower centrifugal region having a cylindrical shape, wherein an inner diameter of said upper region is larger than an inner diameter of said lower region, wherein said upper region is separated from said lower region by said middle region

having at least one cylindrical shaped portion, and overall a decreasing diameter from said upper region toward said lower region and wherein said lower region has a closed bottom.